UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
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CHICAGO, ILLINOIS 60604-3590

Reply to the Attention Of: SR-6J

January 10, 2018

Mr. Todd Konechne
The Dow Chemical Company
1111 Washington Street
Midland, MI 48640

RE: Draft Tittabawassee River Segments 6 and 7 Response Proposal
Tittabawassee River, Saginaw River & Bay Site, Michigan
EPA Document #EPA2018.001

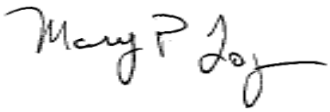
Dear Mr. Konechne:

The United States Environmental Protection Agency (EPA), in consultation with the Michigan Department of Environmental Quality (MDEQ) (jointly, the Agencies), has reviewed the draft Tittabawassee River Segments 6 and 7 (OU1) Response Proposal (RP 6&7) for the Tittabawassee River, Saginaw River & Bay site. The draft RP 6&7, dated October 20, 2017, was submitted by The Dow Chemical Company (Dow) pursuant to requirements of the January 2010 Administrative Settlement Agreement and Order on Consent (AOC), and Section VI, Task 8 of the Statement of Work (SOW) – Appendix A to the AOC.

The Agencies have reviewed the draft RP 6&7 in accordance with Sections X and XI of the AOC. The Trustees also provided review comments. Consolidated comments are attached. In accordance with paragraph 37 of the AOC, EPA is requesting Dow to review the comments, revise the RP 6&7 accordingly, and resubmit the document in accordance with the AOC and SOW. EPA is requesting that Dow submit the revised RP 4&5 no later than March 30, 2018. EPA is also requesting a written response to comments along with the revised document.

Please contact me at (312) 886-4699 if you have any questions.

Sincerely,



Mary P. Logan
Remedial Project Manager

cc via email: J. Victory – MDEQ
L. Williams – FWS
N. DiCosmo, J. Cahn, C. Garypie – EPA
J. Pistro – Dow
S. Hayter, K. Bell – Ramboll/Environ

Agencies' Review Comments on the
Draft Tittabawassee River Segments 6 and 7 Response Proposal, Dated October 20, 2017
Tittabawassee River, Saginaw River & Bay Site, Michigan

Review comments were received in many different formats. EPA has attempted to consolidate comments for content, but have retained varied formats. If comments are unclear, please contact EPA as soon as possible.

A. Major Comments

1. Superfund non-time critical removal action (NTCRA) authority is being used for this Response Proposal. As such, and pursuant to the AOC, any decision made by EPA, in consultation with the MDEQ, will not constitute the final remedy for Segments 6 and 7 – a final remedy determination will be made in a later Record of Decision (ROD), after a full risk assessment has been completed. At the time of the final ROD (or earlier, if warranted) the Agencies will evaluate whether additional remedial action objectives (RAOs) and/or response actions may be necessary for Segments 6 and 7. The evaluations used in this document are sufficient to support the currently identified bases for the planned NTCRA. However, future work will need to evaluate all relevant exposure pathways and receptors and ensure that risks are at acceptable levels.

2. Sediment Management Areas (SMAs)
    a. The Agencies agree that the four areas currently identified in Segments 6 and 7 should be SMAs. Pursuant to the AOC and SOW, other SMAs may be identified in the future, if warranted.

    b. The Agencies believe that specific combination response actions may be appropriate for some SMAs because of their distinct characteristics. As noted in Dow's cover letter, the revised Response Proposal should include combination alternatives, developed with the Agencies.

    c. The criteria to identify SMAs is somewhat unclear. The identification of SMAs and the criteria may need to be refined, depending on the success of the NTCRAs at meeting acceptable residual risk levels.

    d. The SMA boundaries are preliminary and may need to be further refined. Additional delineation is likely to be necessary as part of the design phase of this response. The actual TEQ concentrations present in and around potential SMAs needs to be considered for the final design.

3. Bank Management Areas (BMAs)
    a. The Agencies generally agree that the four areas currently identified in Segments 6 and 7 should be BMAs. However, some refinements may be needed during design.

b. The Agencies will work with Dow to resolve the status of the bank areas of interest. Additionally, pursuant to the AOC and SOW, other BMAs may be identified in the future, if warranted.

c. Section 3.9 and Figure 3-17 process – At this time the Agencies are not "approving" the BMA identification process and will continue to work with Dow. As we have discussed and commented on previous RPs, the Agencies consider this to be an adaptive management approach to meet the shared goal of addressing the worst TEQ contributing banks first. The current stability and TEQ criteria identifying prioritized banks may need to be refined over time, depending on the success of the NTCRAs at meeting acceptable residual risk levels.

d. Refinements to the BMA identification process, if needed, could consider: surface TEQ (because the high TEQ is already present at the surface and even relatively low amounts of erosion could present a problem); historic air photo evaluation; evidence of mass wasting; and possibly other evaluation metrics.

e. The Trustees raised specific questions about the potential need for additional review of core samples that represent industrial levees and have elevated TEQs. See comments 18.b and 32, below.

4. SCOIs – The Agencies have commented previously on the SCOI evaluations done in upstream segments. EPA has determined that the bases for action presented in this RP 6&7 are appropriate to proceed with development and selection of NTCRA response options for the currently identified Segments 6 & 7 SMAs and BMAs. On December 18, 2015, Dow submitted the "Sediment and Bank Soil SCOI Screening for Segments 4 through 7, Tittabawassee River." The Agencies anticipate completing our review of the SCOI screening as part of Task 10. SCOIs must be fully addressed in the Task 10 residual risk assessment, and may result in additional Segments 6 & 7 analysis/work and/or post-construction monitoring.

B. Specific Comments

5. Executive Summary – There may need to be changes to this summary based on the comments on the main text. Also, please include something like the discussion in Section 1.2 in the Executive Summary to clarify how the actions in this RP fit into the overall site management approach.

6. Table of Contents – Table 3-4 is incorrectly listed here. It should list "Segments 6 and 7 Bank Soil Analytes."
7.
8. Section 2.2 – Please expand the discussions of Segments 6 and 7 to include public areas such as West Michigan Park, Center Road Boat Launch, trails of Green Point Nature Center, and State of Michigan property that will likely become a public park at the confluence.

9. Section 2.5 – PCOI Distributions in the River. The duration of the period of direct discharge to the river is not known. It would be more accurate to state (additional/modified language in ***italic boldface***): ***Beginning with the direct discharge period in the early 1900's, the waste anode and cell body particles*** containing the PCOI contaminants mixed ….(or similar).

10. Section 2.6.1 - In Channel Geologic Stratigraphy**,** Page 9. This section should be clarified to indicate that glacial till does contain till sand units that can be extensive. These till sands are commonly used for as a potable water source in the study area.

11. Section 2.7.2, page 10. The 2nd paragraph discusses "stabilizing caps" for the Segment 1 SMAs. Please also mention that there were sheet pile/GCL containment systems at the SMAs with DNAPL.

12. Section 2.7.2.3 – Please add the Segment 1 final report, submitted in 2017, as a reference.

13. Section 2.7.3.4, page 14. The first full paragraph states "The Envirolok wall will be replaced …" It seems that this paragraph is discussing the quilt application and not the Envirolok wall which was widely applied in Reach M.

14. Section 3.2, page 20, 3rd full paragraph – Please note that the Agencies have not fully approved this ICS methodology (see the approval with modification letter from EPA to Dow dated May 10, 2012), but are open to working with Dow to continue to refine this methodology to improve its potential usefulness, especially for long term trend monitoring and to better understand surficial sediment TEQ concentrations

15. Section 3.2.1, pages 20 – 23:
    a. Similar to previous reviews of the earlier response proposals, the DEQ has requested that Figures 3-2 and 3-3 be revised or supplemented with figures that show TEQ concentrations less than or equal to 100 parts per trillion (ppt) TEQ and greater than 100 ppt TEQ but less than or equal to 500 ppt. As an alternative, please expand the RP to include a new table that lists the length weighted average TEQs (LWAs) for each of the cores and identifies the core intervals (length and TEQ) used to calculate the LWAs. In this way the Agencies would have ready access to the information and could spot check the calculated LWAs and verify that the length of core used is appropriate.

    b. Please consider augmenting this section with a description/calculation of the uncertainty associated with the composite surface sample average concentrations and the surface weighted average concentration presented for Segments 6 & 7.

    c. Page 23. EPA's FIELDS group calculated SWACs from the discreet samples in Segments 6 and 7 using four methodologies: Actual Points; Weighted Thiessen Polygons; Inverse Distance Weighting (IDW) Interpolation; and Natural Neighbor (NN) Interpolation. In all cases EPA's results were different from the numbers presented in the RP, especially for Segment 7. Because this baseline value will be important when evaluating trends, the Agencies and Dow need to understand and agree on how this value is generated.

16. Section 3.2.2 – In-Channel Sediment Secondary Constituents of Interest: See Major Comment 4, above.

17. Section 3.2.3 – Core Log Review: Page 23, 1st paragraph of the section. This section states that there were 224 cores, while the previous section on page 21 states that there were 222. Please reconcile.

18. Section 3.3.2.1 – PCOI Results from 2007 – 2014 Bank Soil Coring
    a. Similar to the requests on SMAs, the Agencies would find it more useful if Figures 3-8 showed more refined TEQ concentration intervals (less than or equal to 250 ppt TEQ and greater than 250 ppt but less than or equal to 500 ppt TEQ and greater than 1000 ppt but less than or equal to 2000 ppt TEQ. This could help in understanding the BMA prioritization and for integrating the bank areas with the floodplain assessment/cleanup.

    b. Page 26*:* The Trustees have concerns that it is not clear from the figures (e.g. Figures 3.7 and 3.8) which bank samples correspond to post-industrial levees or other geomorphic features. For example, does the sample at 1235+00 at the Green Point Environmental Learning Center characterize an industrial levee at that location? Figure 2.2F in the Floodplain Response Proposal (May, 2014) shows an industrial levee extending to either side of 1240+00. Based on Figure 3.8D in the Segment 6 and 7 Draft Response Proposal, the location at this core appears to have lost material from the top of the bank and have TEQ concentrations greater than 5,000 ppt at the bank surface. It seems surprising that this area is shown in Figures 3-29B and 3-31B as having a low TEQ index. The adjacent incremental sediment composite shown in Figure 3-6B at RXX-1240+00-ICCS and then next two downstream composites also showed elevated TEQ concentrations in 2014 and 2015. This suggests the potential for an ongoing source of TEQ from the bank in this area and the need for additional review in this area.

19. Section 3.3.2.3 – The BFC TEQ results may be important in that they show the actual exposed concentration of bank soils that may be eroding into the river. As noted in previous comments on this issue, the surface concentrations of TEQ in bank soils may be an important factor in determining what banks are prioritized for stabilization and what type of stabilization is proposed (i.e., for banks with high TEQ currently exposed at the surface, stabilization technologies that include a barrier component may be more appropriate

20. Section 3.3.3 – Bank Soil SCOIs: See Major Comment 4, above.

21. Section 3.4.2 – Bed Pin Analysis
    a. The bed pin cross sections demonstrate an active bed depth of greater than 2 feet in a number of locations in Segments 6 and 7.

    b. There are locations where additional bed pin transects may be appropriate to evaluate TEQ deposits that have not currently been identified as SMAs. Consideration should be given to how these deposits will be monitored in the future.

22. Section 3.5.1 contains a brief discussion of Segments 1 and 2 benthic community conditions. As commented on previous RPs, the Agencies have questions about the conclusion that "the benthic community in Segments 1 and 2 is diverse, abundant, and comparable to …. reference conditions" because there is some uncertainty about how representative the sampling locations were and validation of the site selection, observations, scoring, and calculation of metrics. Also, as noted, no sample locations were included in Segments 6 or 7. Benthos and other biological receptors (e.g. fish, birds, reptiles, and amphibians) will need to be considered in the ecological risk assessment. As such, the Trustees have recommended that it might be appropriate to perform benthic surveying to have baseline information on benthic communities, including freshwater mussels, prior to implementation of work on Sediment Management Areas in Segments 6 and 7.

23. Section 3.5.3, Threatened and Endangered Species
    a. Please change the titles of Tables 3-5a and 3-5b to ~~Documented~~ Potential Occurrences …, similar to the final Segments 4 & 5 RP.

    b. Despite the footnote to Table 3-5a that federal and state status of listed species was accessed in May of 2017, the information is not entirely accurate. For example, the snuffbox mussel (*Epioblasma triquetra*) was listed as endangered under the federal ESA in March of 2012, yet no federal status is given on the table.

    c. The Trustees have recommended that surveys be conducted for freshwater mussels, and planning for measures to be taken if listed species are found. The Trustees are also concerned with freshwater mussels in general because they are long-lived species with low rates of recruitment and recovery from disturbance. Should freshwater mussels be found in a proposed SMA, the Trustees could work with Dow and U.S. EPA on protocols to translocate mussels to the nearest suitable mussel bed, preferably upstream in order to facilitate re-colonization of the affected area.

24. Section 3.6.3, p. 31. *Identification of Historic or Culturally Significant Resources:*
    a. This section lists resources for identifying known or potential cultural or historic resources, but does not affirmatively state that Dow has consulted or will consult these resources other than searching the National Register of Historic Places. The Trustees recommend that the State and Tribal Historic Preservation Officers be consulted during the planning stage.

    b. The Trustees believe that it is inappropriate to merely rely on a discovery plan. The discovery plan is specifically intended for <u>unanticipated</u> discoveries of remains or artifacts, so experts with local knowledge should be consulted about what can reasonably be anticipated prior to beginning construction.

    c. The Green Point area near the confluence of the Tittabawassee and Shiawassee Rivers is particularly rich in archeological resources. Areas bordering the Tittabawassee and Shiawassee Rivers within the Shiawassee NWR are considered to among the most archaeologically rich sites in the State of Michigan (Castle Museum 2015). Shiawassee NWR conducted a comprehensive assessment of cultural resources within

the administrative boundary of the Refuge (Robertson et al. 1999). As related within the Refuge's Comprehensive Conservation Plan (USFWS 2001), the Refuge has identified 31 cultural resource sites on the Refuge and an additional 42 sites on additional lands within the expansion area of the Refuge. These include prehistoric archaeological sites, historic archeological sites (Native American and Western), industrial and mining sites, farmsteads, and timbering sites. Evidence for early Paleo-Indian cultures (10,000-8000 B.C.) consists only of fluted points in private collections. Other prehistoric cultures are represented in the archeological record: Archaic (8000-550 B.C.) and Woodland (600 B.C.-1600 A.D.).

25. Sections 3.7.2 and 3.7.3 –Additional SCOI data collection may be necessary for the residual risk assessment. Also, see Major Comment 4.

26. Section 3.8.1, Identification of SMA Locations in Segments 6 and 7 – The RP would benefit from more detail on the multiple lines of evidence cited for the identification of a SMA. What concentration is considered elevated? What constitutes a contiguous deposit? How are the TEQ composite sample results factored into the evaluation?

27. Section 3.8.2.5 – Other Areas of Interest in Segment 6 and 7. The first sentence of this section states that there are five SMAs, when there are only four proposed. The Agencies recommend continued stability monitoring of these areas.

28. Section 3.9.1 – Banks in Hardened Surface Areas. The Trustees have previously shared with Dow that they envision bank softening along the shoreline of the former Germania golf course as a desirable restoration project. The Shiawassee National Wildlife Refuge may choose to pursue bank restoration through removal of the hard surface and re-shaping of the left descending bank in Reach WW and the upstream end of Reach XX. EPA requests Dow to keep track of any planned changes for this bank, and may request characterization of this area for TEQ concentrations, and/or may evaluate whether a BMA(s) may be warranted in this area, or other appropriate actions. Currently, the draft Response Proposal does not appear to include any analytical results from this area that is marked as currently being "hard surface" in Figures 3-29, 3-30, and 3-31.

29. Sections 3.9.3.2, Evidence of Undercutting – Is it possible to provide representative LiDAR profiles for each bank section?

30. Section 3.9.3.6 – Model Predicted Bank Erosion Rate.
    a. The calculated rate appears to reflect an average rate over the entire bank full bank face within a 300 foot grid cell. Therefore, the model predictions need to be evaluated cautiously as the averaging process may mask local areas of erosion that may be significant. The bank model erosion rate LOE is a model prediction. When that prediction does not match the empirical LOEs then the model output may be suspect for that location.

    b. The rationale for selecting a 2.5 inch per year erosion rate as the threshold between high/moderate stability and low stability is not clear. Over two feet of erosion in ten

years does not seem to be "stable" – especially with respect to contamination that is near or at the bank face.

c. While the modeled magnitude of the erosion rate is useful for prioritizing the banks for action, the Agencies are not "approving" a modeled loss to the river of contaminated bank soil at less than 2.5 inches per year as being acceptable.

31. Section 3.9.4, Evaluation of Bank TEQ – Please expand the RP to include a new table that lists the bank height, LWA, and Cumulative TEQ Index Percentage for each of the bank cores in Segments 2 - 7. Alternatively, revise the Tittabawassee River Segments 2 – 5 Bank Evaluation Memorandum (12/12/2016, Dow 2016.078) to include Segments 6 and 7.

32. Section 3.9.5, p. 44. *Results of the Segment 6 and 7 BMA Evaluation*: See comment 18.b, above, concerning the potential need for additional review of core samples that represent industrial levees and have elevated TEQs (e.g., in the area of 1235+00 in Segment 7).

33. Section 4.1, Segments 6 and 7 Conceptual Site Model and Basis for Action: Neither Figure 4-1 nor the text addresses the pathway of floodplain soils eroding back into in-channel sediments. The magnitude and significance of this pathway is not currently known.

34. Section 4.2 - Remedial Action Objectives
    a. The RAOs should be linked to contributing to or achieving acceptable risk levels. The Task 10 assessment will need to evaluate other pathways and whether residual site contaminants achieve acceptable human health and ecological risks.

    b. Please note that the 2010 SOW also other General Response Objectives that will need to be evaluated, and met if needed, before response actions can be considered complete.

    c. Measurable Metrics. The RP identifies four measurable metrics. Discussion on how these metrics will be accurately measured, evaluated, and related to the identified Performance Objectives needs to be provided in the RP or Task 4 Monitoring Plans. Additionally, other metrics may be necessary to meet the requirements of the SOW

35. Section 4.3
    a. 4.3.2.7 Michigan Natural Resources and Environmental Protection Act (NREPA)
        i. Hazardous Waste Management – Part 111; The second sentence should be changed to note "hazardous waste."
        ii. Please add Part 201 as a potential action-specific ARAR for soil relocation.

    b. 4.3.2.9 Last sentence states "Although Segments 6 and 7 are not on public or Indian lands …" However, response actions may include work or access at the Shiawassee National Wildlife Refuge.

36. Section 5.1.1, Monitored Natural Recovery – The Agencies continue to have concerns with the TEQ transport model.

37. Sections 6.3.1.1, 6.3.4.1, and 6.3.5.1, Alternative 1 (MNR)
    a. There is an inconsistent discussion of the potential for erosion and downstream transport of elevated TEQ. Section 6.3.1.1 indicates that portions of SMAs 7-1, 7-2, and 7-3 have elevated TEQ at/near the surface. However, section 6.3.4.1 concludes that 7-1 has a low erosion potential, while section 6.3.5.1 concludes that transport of TEQ from 7-1 is possible. The Agencies believe the interpretation of section 6.3.5.1 is most accurate. Please reconcile the conclusions

    b. 6.3.1.1, page 72. The discussion for SMA 7-2 says that "… at location RYY-1258+00-IC283 …"; it should be RYY-1258+50-IC283

    c. Section 6.3.5.1 – MNR has not been demonstrated to be effective on an acceptable timescale in the absence of additional secondary source controls. Other items that are not discussed include: changes in river morphology could alter the course of the main channel and erode SMA deposits; and long-term risk of deposit loss.

38. Section 6.3.2.2 – Compliance with ARARs. Alternative 2 (In Situ Containment) and identifies a 0.1 foot limit mandated by the Michigan Floodplain Act. This has been reviewed by DEQ Water Resources Division staff and determined to be incorrect. No increase is allowed under the Act.

39. Section 6.3.4.3, p. 78 discusses Green Point Island and potential impacts from response actions at SMA 7-2. The Trustees encourage early coordination with the Shiawassee National Wildlife Refuge if significant impacts like those described in this paragraph are anticipated on federal land. Note also that SMA 7-1 also appears to be adjacent to land managed by the Refuge while still owned by the City of Saginaw.

40. Section 6.3.6 – An expanded discussion of access implementation issues would be useful. Possibly a figure could help illustrate some of the challenges.

41. Section 6.3.6.3 – There is no discussion of implementability of wet removal.

42. Section 6.4.1.2 – As noted above DEQ does not agree that the 0.1 foot limit with respect to flood elevation increases is accurate.

43. Section 6.4.2 discusses an estimate of truckloads per every 100 ft. of BMA removed. Some of this discussion should be included in short-term effectiveness.

44. Figure 3-6 – The ¼ composite data is a very good data set. However, the presentation in this figure is very confusing to most reviewers. Rather than understanding that each "stripe" in the quarter mile represents a different time frame, they think that it results moving across the river. This is true even for reviewers who have been presented this information often. EPA strongly recommends finding a different approach. One method could be similar to what is done with groundwater data that is from the same location over time – a table linking back to the location. You could still use the color scheme in the table.